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Cleaner Technology and Energy Efficiency:
Structuring A Competitive Advantage Conference

The Search For Low-VOC Coatings In Factory Finishing



PrimeTECH

Presented by: Dennis Connelly, COO
April 5, 2007



Brief History

- Founded in 1983
- Pioneered by Fred Churchill
- Brought “pre-staining” to the Northeast
- Makes siding last longer
- Saves a step for the builder
- Has become “industry standard”





today, our goal must dictate our choice of restoration materials," Zannieri says. "In the case of the Paul Revere House, we're lucky that we're able to use a material as beautiful and durable as cedar, while still providing a historically accurate restoration."

Lang also mentions how today, many manufacturers offer western red cedar siding prefinished on all sides. This finishing technology is important as it ensures the highest level of quality-finished product, greatly increasing consistent coating, reducing on-site installation costs, and maximizing overall resistance to moisture. Therefore, homeowners can now choose the desired finish color and simply install—helping to reduce labor costs and on-site waste.

Additionally, recent advancements in UV blockers/inhibitors utilizing

PROPOSED
future performance



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wide range of finishes. Whether the project calls for S152E or S45, we offer lengths ranging from 16' to 20'. Pattern stock is also available.

1x4 - 1x12
3/4x4 - 3/4x12
2x4 - 2x12

The Finest Stock, The Best Coating

Our Siskiyou Forest Products **RESERVE** line is specially manufactured and treated to create the highest quality product available. Using state-of-the-art processing and curing equipment, our premium stock is made



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Churchill Coatings
builds a reputation.



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Prepriming perfects wood siding

By **Dennis Connelly**
Chief operating officer, PrimeTech
Member, Joint Coatings/Forest Products Committee,
U.S. Forest Products Laboratory

WOOD siding has always had a place in high-end and historic homes, and for the purists who simply want a beautiful result on their dwelling.

Vinyl siding was, and fiber-cement lap siding now is, the first choice among those who want a low-cost, low-maintenance alternative. The missing message is that wood siding is low-maintenance and does not need to belong only to the upper reaches of the home building food chain. Why? Because over the course of 20 years the overall cost gap between these products has narrowed considerably.

Many of us would pay the extra money for wood siding if we knew that it would not need repainting for a very long time. Lucky for us, there is actually government research that addresses this issue. After all, the machine finishing industry claims that wood is low-maintenance if coated properly. What may be surprising is that "coating it properly" doesn't mean knowing much of anything about how to coat it properly. All you have to do is preprime the wood before installation and it will last. Even prepriming with average coatings would outlast great coatings that are applied only after installation.

Coatings research led by Sam Williams at the Forest Products Laboratory in Madison, WI, part of the U.S. Forest Service, can back that up with scientific fact.

How does this work? Sunlight degrades raw wood. It breaks the lignin that bonds the wood fibers together leaving a surface that is unsound for a tight paint film bond. The photo below shows how this affects the long-term

integrity of the paint film. Each column of siding shown has been primed with the same oil-based primer and the same latex topcoat. Furthermore, they were coated 20 years ago within four months of each other. The one that

20 Years Later



was preprimed still looks great today. The other was allowed to weather for 16 weeks before the primer was applied. Note that as little as one week of pre-weathering can make the difference.

Other testing at the FPL over the years has led to the basic notion that the perfect coating system for exterior-use wood is one coat of preprimed oil-based primer and two acrylic latex topcoats either machine-finished or hand-applied. My own experience in the lumber and coatings industry has taught me that the natural beauty of real wood can be enjoyed by anyone willing to maintain their siding as often as they might their roof.

The alternative siding choices are not "no" maintenance and all have some form of wear-out feature. Therefore, if you want low maintenance as well as the look and charm of real wood, the only product that has those benefits is real wood.



PRIMED after installation, 20-year-old test fence at the Forest Products Laboratory in Madison, WI., is showing its age.



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David Fine

Fred

Dennis

Eric Churchill



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Two Kinds of Coatings

- Latex-based (Water)
- Oil-based (Mineral Spirits)

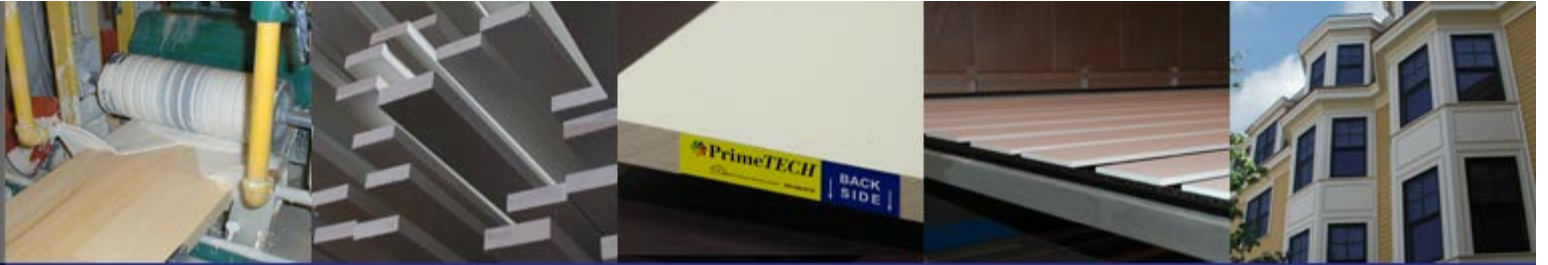




The Problem

- The market likes oil based
- Oil inhibits extractives
- Oil doesn't raise the grain





Extractive Stains





Raised Grain on Finger-Jointed Wood





The Second Problem

- Oil coatings contain 3 lbs. VOCs
- Permits restrict VOCs
- Production is severely limited

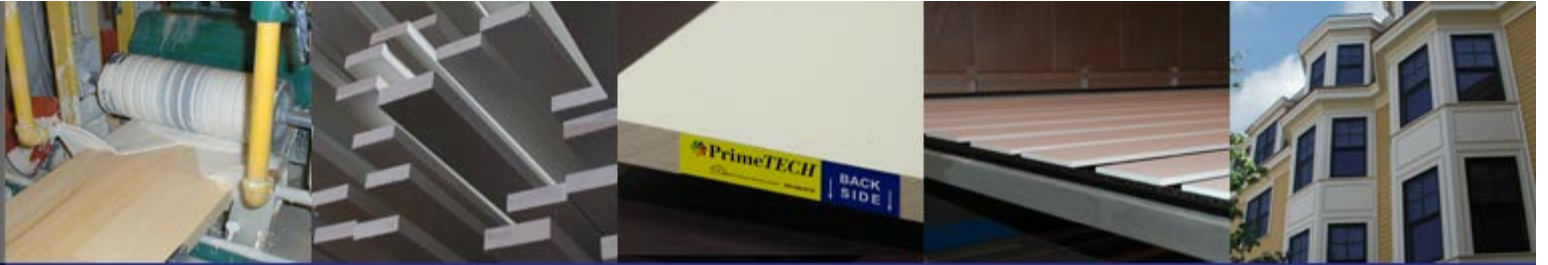




The Final Straw

- In 2000, our permit was reduced
- New level was catastrophic
- We faced closing the business





Mass. DEP Addresses Issue

- Don't go out of business
- Talk to the OTA
- Work on the industry problem
- Good example of a government agency working with people





The Plan

- Delay permit reduction
- Research solutions
- Report results





Revved up Paint Labs

- Cabot
- Sherwin-Williams
- FMI Corp.
- Zinsser
- Coatings testing too numerous to count
- Lots of John Raschko's time
- Result: Difficult to be under 2.8 lbs

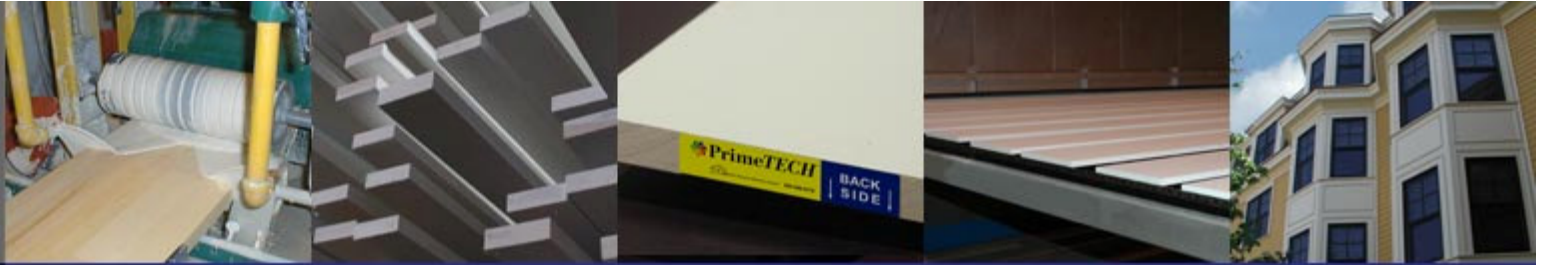




UMass Project

- \$100 thousand in grants
- Research Chemist
- Completely reformulate coating
- 100% solid, catalyzed
- Different kind of curing
- Result: Failure

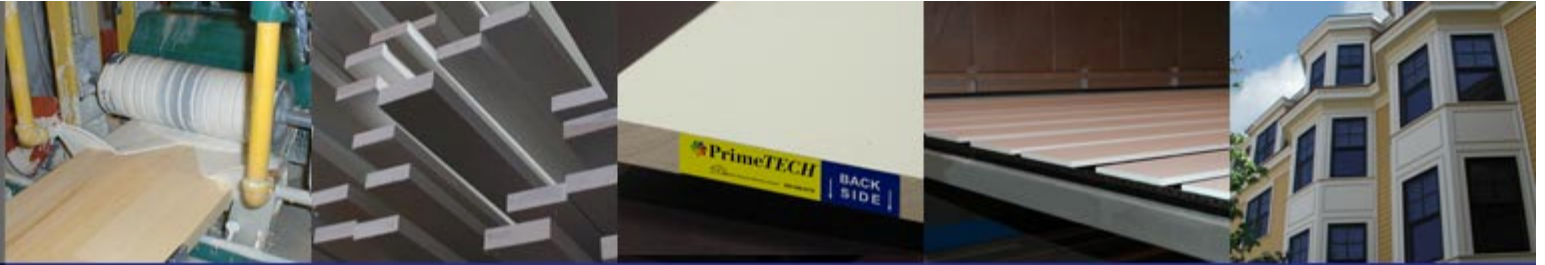




E-Beam Cure

- Advanced Electron Beam - Curing
- Cabot - Coating
- Sartomer - Resins
- Good results on tiny samples
- As yet, unable to test longer boards
- Result: Inconclusive





Alternative Technologies

- VOC Incineration
 - Prohibitively expensive
 - Uncompetitive
- E-Beam VOC Destruction
 - Promising
 - Ongoing Testing





Market Direction

- CC promotes latex
- Some success in increasing 2-coat
- Topcoat is latex
- Increases volume adding little VOC
- Increases competitiveness

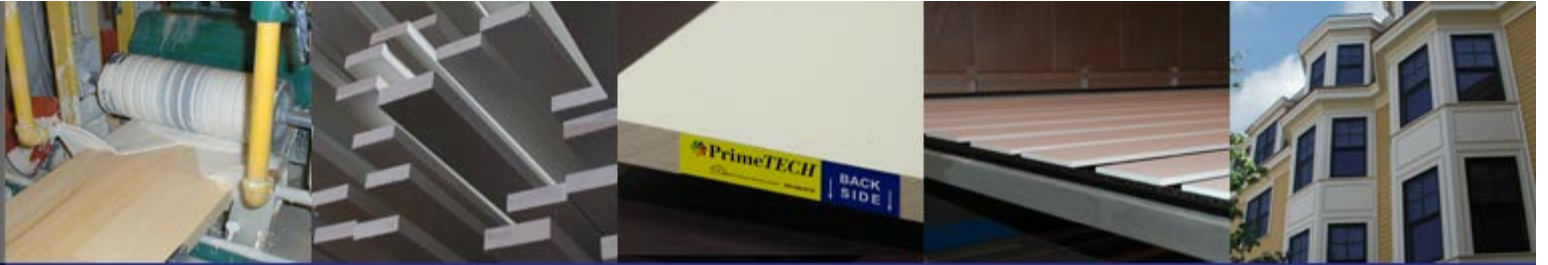




The Drama

- DEP Agreement Ending in 2006
- Re-applied for permit
- Still under review
- But...





Deus Ex Machina?

- Could this end like a cheap novel?
- Market changes to two coats
- 1st coat: Oil primer (of course)
- 2nd coat: Latex Topcoat
- FMI gets an idea!

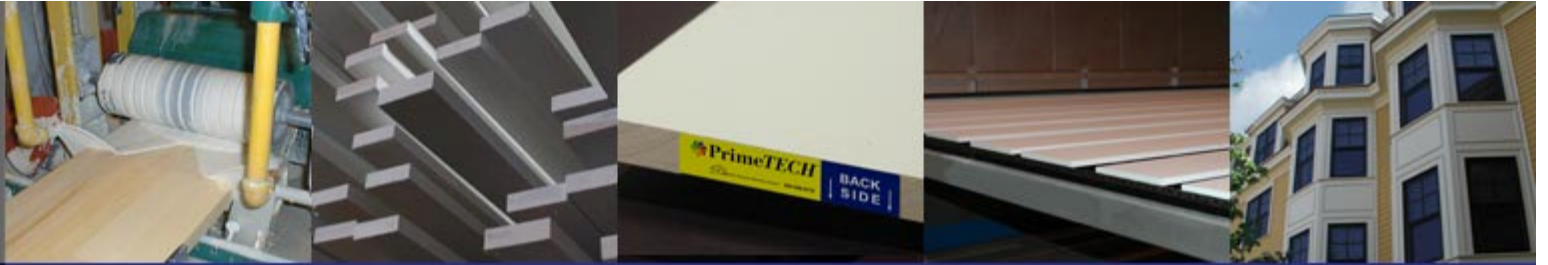




Harry Fine Creates A Coating System

- 100% Solid 0-VOC Linseed Oil
 - Old technology, Clear coating
 - Penetrates wood fibers
 - Preserves and waterproofs
- 0-VOC Acrylic polymer topcoat
 - Durable
 - Spray-applied
 - Oven-cured





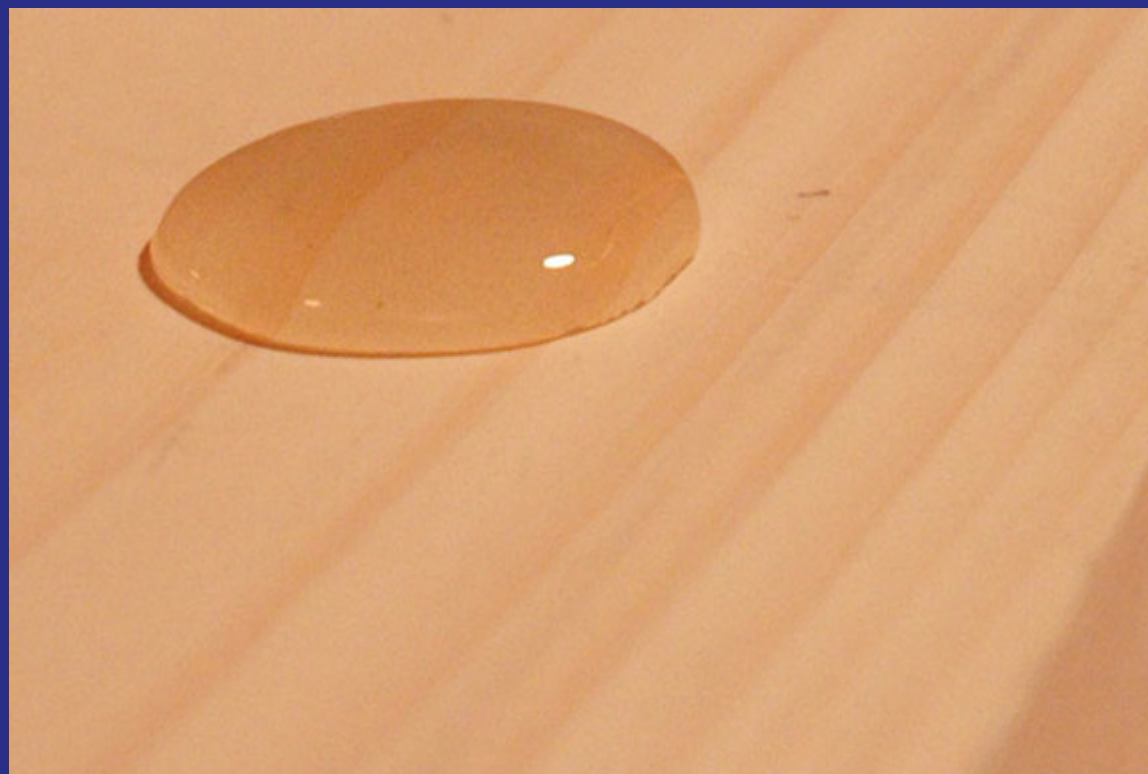
Re-Built Operation

- Designed and built new machine for new primer
- Designed and bought new machine for new topcoat





Linseed Oil at Work





Gas Convection Oven



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Introducing:



Clean Planet Coating Technology™



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Ze-VO = Zero-VOC

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Back Cover Ad in Major Trade Paper



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Bright Spots

- Perfect for any 2-coat white wood applications
- Most white woods are now using 2-coat systems
- White woods are a growing segment





Challenges

- Not yet working for cedar
 - working on it
- Still need a one-coat opaque coating
 - working on it
- Long dry times for primer
 - working on it



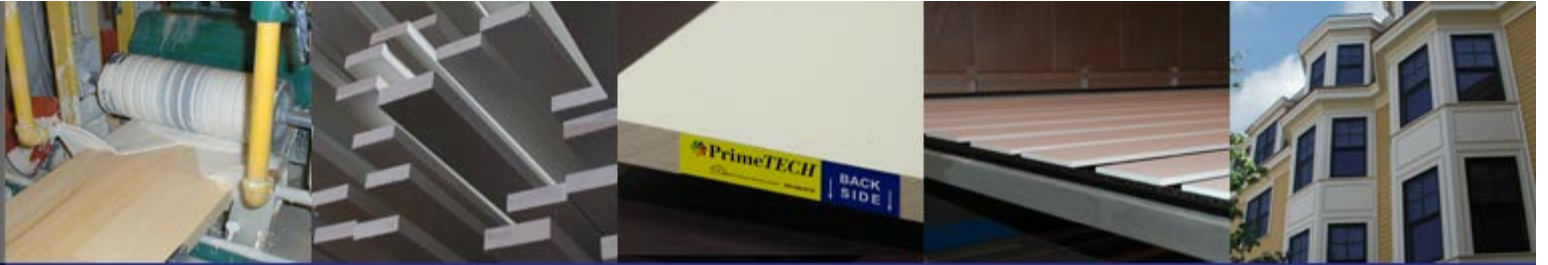


Hope

- We believe we will resolve the remaining hurdles with the coating
- AEB might perfect the e-beam VOC destruction system



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Conclusion

- We wouldn't be here if the Commonwealth of Mass. hadn't worked with us to find a solution
- Mass. DEP and the Office of Technical Assistance were instrumental and may even have helped to transform an industry



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Thank You.



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